Mapping out the future

The latest in genomic tools

Image supplied by Illumina, Inc.

Genomics is often described as the study of all genes of a cell or tissue at multiple levels including: DNA (genotype), mRNA (transcriptome) and protein (proteome). Many researchers in this field are currently focused on intensive efforts to determine entire DNA sequences of organisms and to fine-scale attempts at genetic mapping. Thus, the range of tools required to study or map an entire genome can be quite extensive- sequencing systems, amplification kits, libraries, arrays, bioinformatics and software are just some of the important tools used in the field of genomics.

Systems, Instruments and Accessories

Illumina, Inc. has launched the **HiSeq 2000** sequencing system, which allows researchers to obtain 30-fold coverage of two human genomes in a single run. The high output, ease of use, and cost effectiveness of HiSeq 2000 have the potential to transform the way sequencing experiments are conceived and performed. The system offers significant benefits for gene expression and epigenetic profiling compared to microarrays. Using the HiSeq 2000 platform, researchers will be able to generate richer transcript profiles with cost and throughput comparable to microarrays. In a single two-day run, researchers can perform gene expression profiling on 200 samples for less than $200 per sample, including library prep. "These innovations redefine the trajectory of sequencing and, for the first time, take the cost of sequencing a human genome below $10,000," commented Jay Flatley, president and CEO of Illumina.

QIAGEN's newest instrument, the **QIAsymphony AS**, has been launched to enhance laboratory workflow. This new module of the QIAsymphony series provides fully automated setup of QIAGEN assays and PCR kits and combines QIAGEN's experience in sample and assay technologies on a single platform. The QIAsymphony AS extends the capabilities of the QIAsymphony SP sample purification system and simplifies routine work processes through the same easy-to-use, intuitive software. "The new system addresses the complexity of laboratory processes and logistics of PCR assay setup in a straightforward way while maintaining the high performance of QIAGEN real-time and end-point PCR kits and PCR assays," says Rafael Alvarez, Senior Global Product Manager for Automated Systems at QIAGEN.

454 Life Sciences has launched a new **REM e System**, a robotic accessory module for liquid handling systems which enables complete automation of emPCR enrichment in the Company's Genome Sequencer FLX Titanium workflow. The REM e System dramatically simplifies the sequencing workflow by replacing five hours of dedicated manual lab work with an automated walk-away procedure. The module can be readily integrated into most commonly available liquid handling platforms, providing a cost-effective solution to increase sequencing productivity and consistency for all GS FLX Titanium series run formats. The new automation solution represents one of a series of recent improvements to streamline the sequencing system's end-to-end workflow, from sample preparation through data analysis.

Kits and Tools

The **GenoMatrix™ Whole Genome Amplification Kit** from **Active Motif** is used to amplify an entire genome from a small amount of genomic DNA, so any gene in the organism can be studied while preserving the limited sample. The kit provides up to a 500-fold amplification starting from as little as 10 ng of any type of genomic DNA, while maintaining sequence representation of the starting material. All reagents needed to quickly and easily perform genome-representative amplifications are provided in the kit. Providing high-efficiency amplification and

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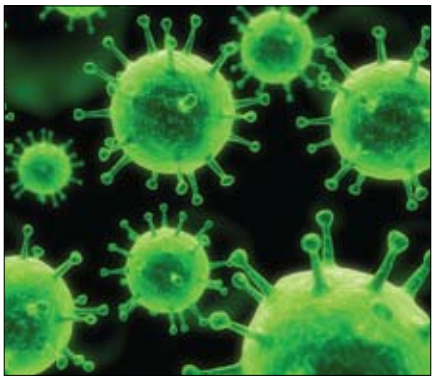
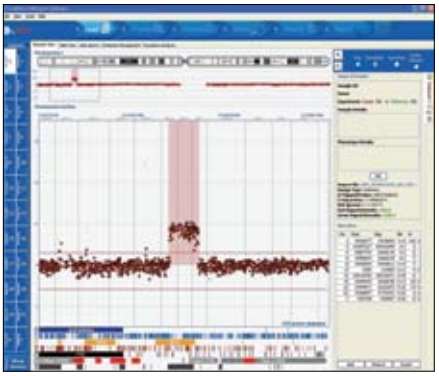


Thermo Scientific GIPZ viral Green Virus



Oxford Gene Technology - CytoSure Interpret software

validated for use with samples generated by ChIP-IT™ Express and the MethylCollector™ and UnMethylCollector™ Kits, the GenoMatrix Kit allows for a seamless transition into microarray analysis or other applications requiring a large quantity of DNA.

Agilent Technologies Inc. has announced the availability of **Brilliant III Ultra-Fast QPCR** and **QRT-PCR Master Mix Kits**, offering significantly reduced cycling time and superior sensitivity without compromising the accuracy and reproducibility of nucleic acid quantification. The Brilliant III Ultra-Fast QPCR and QRT-PCR Master Mix reagents are designed to provide the fastest cycling times on any real-time PCR instrument. These reagents feature a newly engineered Taq, delivering a faster extension rate combined with a novel hot-start technology to minimize non-specific amplification. The ultra-fast reagents allow for the completion of real-time experiments in less than 40 minutes, giving researchers quicker access to their data without compromising data reproducibility and quality.

RNA interference (RNAi) in primary and non-dividing cells can be performed with **Thermo Scientific Open Biosystems' GIPZ Lentiviral shRNAmir**. This is now available for individual constructs from the human and mouse GIPZ Lentiviral shRNAmir collections in a high-titer, purified lentiviral particle format. Benefits include greater specificity and efficient low copy knockdown, tracking of shRNAmir expression with turboGFP, RNAi extended to primary and non-dividing cells. This industry-leading high-titer purified virus, at 1 x 10^8 TU/ml in 2x25 µl aliquots, allows for multiple experiments in a variety of cell types requiring variable multiplicity of infection (MOI) conditions at a minimised toxicity. The transduction-ready, high-titer lentiviral particle format reduces the time, labour and costs associated with preparing DNA as well as packaging and purifying lentivirus for your RNAi experiments. Searches can be carried out with over 165,000 pre-made GIPZ Lentiviral shRNAmir constructs that target human and mouse genomes.

Arrays

A high resolution **CytoSure™ Duchenne Muscular Dystrophy (DMD) array** has been introduced by **Oxford Gene Technology**. Featuring a 4 x 44k format and dense probe coverage of the DMD gene region, this new array offers increased confidence in detecting deletions and duplications within the DMD gene. The CytoSure DMD array has undergone a process of empirical testing and optimisation to provide probe sets of extremely high sensitivity and specificity. Average exon probe spacing of 10 bp (106 bp within introns) ensures excellent resolution. As a result the entire DMD gene is covered on a single 44,000 feature array, which enables 4 full arrays per slide, maximising cost-efficiency by reducing the cost per sample.

Fluidigm Corporation has released its 48.48 **Access Array™ integrated fluidic chip (IFC)** for 454 FLX™ users active in Amplicon Tagging. This Access Array IFC automatically generates emPCR-ready libraries by simultaneously combining 48 samples and 48 primer sets to produce 48 uniquely-barcoded samples per chip. Fluidigm's Access Array IFC, when used with a 454 FLX sequencer, can capture up to 12 kb of sequence data per sample, or 576 kb per array. Upcoming applications on the Access Array system, such as long range PCR, will allow for users to target up to 480 kb of sequence data per sample, or 23MB per array.

Software

Oxford Gene Technology (OGT), has introduced its new **CytoSure™ Interpret software**, for faster and easier translation of oligo aCGH data into meaningful results. This new release builds on OGT's previous software package with the addition of significant functionality such as the 'Accelerate' workflow, for speeding-up and streamlining the analysis and interpretation of aCGH data. CytoSure Interpret ensures that cytogeneticists and molecular biologists benefit from highly flexible workflows and in-depth contextual information for clearer data interpretation.

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President and CEO of Illumina

The 'Accelerate' function enables the automation of data analysis workflows, minimising the need for user intervention and maximising the consistency and speed of data interpretation. Users are able to tailor the software to their needs, customising numerous functions including normalisation, aberration detection and report generation.

Softgenetics has announced that its **Genemarker software** now features new haplotype analysis functionality for use in areas such as genetic-disorder research and pre-implantation studies. The new functionality eliminates the errors of manual data transfer while automatically drawing family groups and assigning the first-order-approximation phase of the alleles while deducing the haplotype of the children from familial data. Genemarker is a genotyping tool that may be used with commercially available clinical assays for both autosomal and X-linked traits for diagnoses of diseases such as cystic fibrosis and DMD.

Companies mentioned in this Product Focus:

454 Life Sciences – www.454.com
Active Motif – www.activemotif.com
Agilent – ww.agilent.com
Fluidigm – www.fluidigm.com
Illumina – www.illumina.com
Oxford Gene Technology – www.ogt.co.uk
QIAGEN – www.qiagen.com
Softgenetics – www.softgenetics.com
Thermo Scientific – www.thermo.com